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Aspects of children's early representational drawing ability may provide evidence for feature marking in non-linguistic symbol systems. To test this assumption children in kindergarten, second, and fourth grade were asked to draw a set of referent objects in three conditions: a nominal or standard condition with no implied relationship ("two people," "two dogs," and "two horses") and two contrastive conditions (the same referents talking to or looking at each other). It was predicted that each object would consistently be represented in a specific canonical orientation (front for people and side for horses and dogs) and, at the same time, the side orientation would be used to convey the intended relationships in the contrastive condition. When the object's canonical orientation is at variance with the orientation generally used to convey the intended relationship, then increased difficulty in graphic communication will occur. The results fit the predicted model with the major developmental shift in children's ability to graphically differentiate nominal and contrastive conditions occurring between kindergarten and second grade for drawings of horses and dogs between second and fourth grade for drawings of people. The role played by the canonical orientation is seen as analogous to that of the unmarked term in language acquisition. (Author)

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The Role of Canonical Orientations in Children's Drawing of Interpersonal Relationships: Aspects of Graphic Feature Marking

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Footnote to Cover Sheet

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ABSTRACT

Aspects of children's early representational drawing ability may provide evidence for feature marking in non-linguistic symbol systems. To test this assumption children in kindergarten, second, and fourth grade were asked to draw a set of referent objects in three conditions: a nominal or standard condition with no implied relationship ("two people," "two dogs," and "two horses") and two contrastive conditions (the same referents talking to or looking at each other). It was predicted that each object would consistently be represented in a specific canonical orientation (front for people and side for horses and dogs) and, at the same time, the side orientation would be used to convey the intended relationships in the contrastive condition. When the object's canonical orientation is at variance with the orientation generally used to convey the intended relationship then increased difficulty in graphic communication will occur. The results fit the predicted model with the major developmental shift in children's ability to graphically differentiate nominal and contrastive conditions occurring between kindergarten and second grade for drawings of horses and dogs and between second and fourth grade for drawings of people. The role played by the canonical orientation is seen as analagous to that of the unmarked term in language acquisition.

The Role of Canonical Orientations in Children's Drawings of Interpersonal Relationships: Aspects of Graphic Feature Making

Recently, several researchers have argued for the formative role played by prototypical concepts and representations in early cognitive growth (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). Others have stressed the influence of the demand characteristics of each symbol system in the development of cognitive processes (e.g., Gardner, in press; Ives, in press; Olson, 1970). Within symbol systems such as language, prototypical concepts are often expressed by the notion of feature marking where one pole of a concept is seen as primary (c.f. Bierwisch, 1967; Clark, 1973). In the present paper we are looking at manifestations of this approach in another symbolic system: the role of an object's orientation in children's drawings.

Arnheim (1974) has suggested that orientations are a fundamental aspect of drawing. Moreover, standard or canonical forms of representation using specific orientations have been reported in a variety of experimental tasks (e.g., Cooper & Shepard, 1975; Harris & Strommen, 1972: Rosch et al., 1976). In studies of children's drawings Ives and Rovet (in press) and Stein (Note 1) have found a consistent use of specific orientations when children of all ages beyond the scribble stage are asked to draw common objects without a model. In addition, Freeman and Janikoun (1972) and Ives (Note 2) report that when children prior to age seven draw a familiar object from a model, they tend to depict the object in one specific orientation, regardless of the orientation within their own viewpoint.

Just as Rosch et al. (1976) state that prototypical cognitive representations should be ones which provide the necessary information with the least amount of cognitive effort, Arnheim (1974) has suggested that a person will draw an orientation that provides the defining visual features in the simplest manner within the two-dimensional structure of the graphic medium. For instance, one would expect that horses should be depicted in the side view to show the defining mane, leg, and tail relationships and people should be depicted in the front view to show the symmetry of features.

Arnheim (1974) also indicated that the side view or orientation may be used to convey implicit information such as the object's mobility since this orientation is one of the simplest ways of showing an object "moving" across the pictorial surface. Ives and Rovet (in press) found that children beyond first grade and adults indeed use the side view to indicate both common and novel objects in motion in their drawings. Children prior to second grade generally draw the object in its canonical orientation and do not differentiate the drawing of an object from a drawing of the object in motion.

Goodnow (1977) has demonstrated the usefulness of linguistic analogies in the study of children's drawings and in explaining the above results Ives and Rovet (in press) hypothesized that the use of object orientations to convey meaning follows certain rules which are analogous to feature marking in language. Specifically, the canonical orientation is similar to the unmarked or nominal linguistic case; the later developing ability to depict a contrastive instance such as motion by either rotating an object with a front canonical orientation (i.e., a person) to the side or using additional motion cues on objects

with side canonical orientations (i.e., a horse) is similar to the ability to use marked or contrastive linguistic terms. In language development it has been argued that the unmarked term stands for all cases until the marked term is mastered (Clark, 1973). For example, the term "more" presumably stands for quantity rather than a comparative amount until the term "less" is acquired. Similarly, the canonical graphic orientation most likely does not represent the object in a particular orientation until it stands in contrast to other orientations.

In the present paper we will attempt to use the feature marking model proposed by Ives and Rovet to make predictions about additional graphic behavior. While they studied drawings of single objects and used motion and rest as the contrastive and nominal instances, in this study we examine drawings of multiple objects and use the presence or absence of relationships between objects as the contrastive and nominal instances. The demand characteristics of the graphic medium would predict that the side view would be used to indicate a relationship between two objects; these objects would be depicted "facing" each other across the flat page. However, the referent object's particular canonical orientation would influence the child's ability to place objects in a facing position. Specifically, it would be more difficult to indicate two objects with front canonical orientations (i.e., people) in facing positions than two objects normally drawn in the side view (i.e., horses). Therefore, there would be a developmental lag or décalage between children's ability to graphically differentiate two people in a particular relationship (nominal instance) and children's ability to perform the same task using horses or dogs as the referent objects.

To test these assumptions ninety children (equal numbers of boys and girls in kindergarten, second grade, and fourth grade) in

a public school in a small, generally middle class New England town were seen individually. They were asked to draw one of three pairs of objects in a nominal condition (no implied relationship: "two people," "two dogs," "two horses"). The children then drew the remaining two pairs of objects in two contrastive conditions ("_____ talking to each other" or "_____ looking at each other") so that each child completed a total of three drawings. In order to prevent any "set" effects all children were given the nominal condition first and no one child was asked to draw the same referent or relationship twice.

Two dependent measures were scored: 1) the referent's orientation -- front or side and 2) whether the referents were facing each other. Orientation was determined by rating the orientation of a series of attributes (i.e., eyes, head, legs, etc.) on each object and then assigning the orientation (side or front) in which the majority of attributes were drawn. Two judges scored all the drawings and settled the few differences (less than 5%) by consensus. The effects of grade level, referent drawn, and the stated relationship between referents on each of the dependent measures were analyzed using MULTIQUAL (Block & Yates, 1973), a computer program which performs log-linear analysis by the method of maximum likelihood. This technique allows for the testing of hypotheses concerning contingency tables in a manner similar to ANOVA.

In drawings of nominal instances where there is no implied relationship between the referents drawn, children in all three grade levels draw people mostly in the front view (90%) and horses (90%) and dogs (70%) in the side view. A log-linear model containing only the referent effect best fit the contingency table data ($p > .103$). It

should be noted that a test of goodness of fit requires that the predicted values under the model do not differ significantly from the data (i.e., $p > .05$). In the nominal instance few objects are drawn facing.

When drawing contrastive instances, kindergartners generally depict people with little differentiation from nominal instances in terms of orientation (80% in the front view) or facing (25%). However, dogs and horses, are shown facing in 53 percent of the kindergartner's drawings (versus 5% facing in the nominal instance) and are depicted in the side view in 73% of the drawings.

In second grade children still do not graphically differentiate people looking at each other from the nominal instance (only 30% are facing). In contrastive instances dogs and horses are now almost totally drawn in the side view (95%) and are facing in 88% of the drawings. There is a significant grade level effect for facing ($p > .09$) to indicate two referents talking to each other with the major shift coming between kindergarten and second grade.

By fourth grade, 90% of the people drawn looking at each other are facing, as are 95% of the dogs and horses.

For all grades, in both drawings of dogs ($p > .06$) and horses ($p > .06$) significantly more drawings containing referents facing each other are found in the contrastive instance than in the canonical instance. This is not the case for drawings of people.

The major developmental shifts in graphically differentiating nominal and contrastive instances occur between kindergarten and second grade for drawings of dogs and horses. However, the depiction of people in contrastive instances is not consistently differentiated from the nominal instance until fourth grade. This décalage between

referents fits the predicted model and is most likely caused by the difficulty in changing the canonical orientation for people (front to side) as opposed to simply turning a side view object around to indicate facing.

In general, in the development of representational drawing children initially utilize a canonical orientation for particular objects and this form is used in all instances. Then contrastive forms are acquired to allow for graphic differentiation. This finding is consistent with the notion that graphic representations of early elementary school age children are abstractions of significant aspects of a prototypical referent rather than impoverished versions of specific individual referents (Clarke, Note 4; Ives, Note 5). The grade level trends in the present study parallel those of Ives and Rovet (in press) and are consistent with Goodnow's (1978) finding that children before third grade have difficulty relinquishing general graphic principles such as the arrangement of parts on a given axis when depicting people in motion or bending. The results suggest that the role of canonical orientations in drawing roughly parallels the dominant role played by unmarked terms in the early stages of language acquisition; common underlying principles may be operating in both verbal and non-verbal symbolization. Perhaps it is a general principle of early symbolization to involve the use of standard forms from which differentiation proceeds. It will be useful to see if a type of "feature marking" appears in other forms of symbolization just as development toward increasing hierarchical complexity appears to be a general principle underlying various forms of constructive play (e.g., Greenfield, Nelson, & Saltzman, 1972; Greenfield & Schneider, 1977; Goodson & Greenfield, 1975).

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